

WHAT IS CLAIMED IS:

1. A purification device comprising:
 - a filter, the filter comprising
 - a filter body that includes an interior,
 - a first filter connector in fluid communication with the interior, and
 - at least one ribonucleic acid-capturing (RNA-capturing) membrane disposed within the interior; and
 - a vacuum adapter plate comprising a substrate including a first surface, a second surface, and one or more through-holes extending at least from the first surface to the second surface;wherein the first filter connector is capable of connecting to the vacuum adapter plate to form a fluid communication from the interior of the filter to a respective one of the one or more through-holes.
2. The purification device of claim 1, wherein the first filter connector extends away from the filter body.
3. The purification device of claim 1, wherein each of the one or more through-holes further comprises a tubular connector that extends away from the substrate.
4. The purification device of claim 1, further comprising a sample reservoir device that includes a connector capable of connecting the sample reservoir device to the filter to form a fluid communication between the sample reservoir device and the filter.

5. The purification device of claim 4, further comprising one or more blood-treatment components disposed in the sample reservoir device.
6. The purification device of claim 4, further comprising one or more blood-treatment reagents disposed in the sample reservoir device.
7. The purification device of claim 4, further comprising a lysing reagent, a blood-stabilizing reagent, and an anti-coagulant, disposed in the sample reservoir device.
8. The purification device of claim 4, further comprising a lysing reagent disposed in the sample reservoir device.
9. The purification device of claim 4, further comprising a blood-stabilizing reagent disposed in the sample reservoir device.
10. The purification device of claim 4, further comprising a whole blood sample disposed in the sample reservoir device.
11. The purification device of claim 4, wherein the filter body further comprises a second filter connector disposed on an opposite side of the filter body relative to the first filter connector.

12. The purification device of claim 8, wherein the sample reservoir device includes a reservoir connector, and the second filter connector and the reservoir connector are capable of connecting to each other to form a fluid communication therebetween.
13. The purification device of claim 4, wherein the sample reservoir device comprises a syringe body.
14. The purification device of claim 1, further comprising a filter frit disposed in the interior of the filter body adjacent the RNA-capturing membrane.
15. The purification device of claim 1, wherein the filter body comprises a syringe body.
16. The purification device of claim 1, wherein the at least one RNA-capturing membrane comprises a plurality of RNA-capturing membranes.
17. The purification device of claim 1, wherein the plurality of through-holes comprises from about four to about eight through-holes.
18. The purification device of claim 1, wherein the RNA-capturing membrane is porous and has an average pore size diameter of from about 1 micron to about 10 microns.
19. The purification device of claim 1, wherein the at least one RNA-capturing membrane comprises a hydrophobic membrane.

20. The purification device of claim 19, wherein the hydrophobic membrane comprises a glass fiber membrane.
21. The purification device of claim 14, wherein the filter frit is porous and has an average pore size diameter of from about 20 microns to about 100 microns.
22. The purification device of claim 14, wherein the filter frit comprises a plastic material.
23. The purification device of claim 14, wherein the filter frit comprises a polyethylene material.
24. The purification device of claim 1, wherein the vacuum adapter plate further comprises a drip director extending away from the second surface of the substrate disposed in fluid communication with a respective one of the one or more through-holes.
25. The purification device of claim 24, wherein the drip director includes at least a portion that is conical.
26. The purification device of claim 2, wherein the first filter connector comprises a locking fitting.

27. A purification system comprising:

the purification device of claim 1,

wherein the first filter connector is connected to a respective one of the one or more through-holes, and the purification system further comprises;

a vacuum source; and

a vacuum manifold connected to the vacuum source;

wherein the second surface of the vacuum adapter plate is operatively disposed in the vacuum manifold such that in operation a pressure gradient is created across the RNA-capturing membrane.

28. The purification system of claim 27, further comprising a seal disposed between the vacuum manifold and the vacuum adapter plate.

29. The purification system of claim 27, further comprising at least one collection vessel disposed in the vacuum manifold and arranged to receive fluids drawn through the one or more through-holes.

30. A kit, comprising:

at least one filter, the at least one filter comprising;

a filter body that includes an interior,

a first filter connector in fluid communication with the interior, and

at least one ribonucleic acid-capturing (RNA-capturing) membrane disposed within the interior;

at least one syringe body having an interior volume of at least about 5 ml and including a connector capable of forming a fluid communication with the first filter connector;

at least one syringe body having an interior volume of at least about 20 ml and including a connector capable of forming a fluid communication with the first filter connector;
and

a vacuum adapter plate comprising a substrate, at least one through-hole extending through the substrate, and a connector capable of forming a fluid communication with the first filter connector.

31. The kit of claim 30, further comprising a container and one or more blood-treatment components disposed in the container.

32. The kit of claim 30, further comprising a container and a lysing reagent disposed in the container.

33. The kit of claim 30, further comprising a container and a blood-stabilizing reagent disposed in the container.

34. The kit of claim 30, further comprising at least one collection vessel.

35. The kit of claim 30, wherein the at least one through-hole comprises a plurality of through-holes, and the kit further comprise at least one through-hole sealing device.

36. The kit of claim 30, wherein the at least one filter comprises from about four to about eight filters.

37. The kit of claim 30, wherein the at least one syringe body having an interior of about 5 ml comprises at least twelve syringe bodies each having an interior volume of at least about 5ml.

38. A method, comprising the steps of:

providing at least one filter including an interior, a sample introduction opening in fluid communication with the interior, an output opening in fluid communication with the interior, and an RNA-capturing membrane disposed in the interior;

providing a vacuum adapter plate comprising a substrate having a first surface, a second surface, and one or more through-holes extending at least from the first surface to the second surface, wherein the sample introduction opening is connected to a respective one of the one or more through-holes such that a fluid communication is provided between the at least one filter and the vacuum adapter plate;

introducing a sample containing whole blood cells including ribonucleic acid (RNA) through the sample introduction opening and into the interior of the filter;

contacting the sample with the RNA-capturing membrane; and

causing capturing of the RNA in the sample to the RNA-capturing membrane.

39. The method of claim 38, further comprising washing the sample, excluding the captured RNA, off of the RNA-capturing membrane.

40. The method of claim 38, further comprising eluting the captured RNA off of the RNA-capturing membrane.
41. The method of claim 40, further comprising collecting the eluted RNA in a container.
42. The method of claim 40, further comprising drying the RNA-capturing membrane prior to eluting the captured RNA.
43. The method of claim 40, wherein eluting the captured RNA comprises creating a pressure gradient across the RNA-capturing membrane.
44. The method of claim 38, further comprising pre-wetting the RNA-capturing membrane before causing the capturing of the RNA in the sample to the RNA-capturing membrane.
45. The method of claim 38, wherein introducing the sample comprises creating a pressure gradient across the at least one filter.
46. The method of claim 39, wherein washing the sample comprises creating a pressure gradient across the RNA-capturing membrane.
47. The method of claim 38, wherein the sample introduced has a volume of from about five ml to about 20 ml.

48. A purification device comprising:

a filter, the filter comprising

a filter body that includes an interior,

a first filter connector in fluid communication with the interior, and

at least one ribonucleic acid-capturing (RNA-capturing) membrane disposed within the interior;

a collection vessel including a first open end and a second closed end; and

an adapter plate including one or more through-holes sized to accommodate the collection vessel;

wherein the first filter connector is capable of connecting to the first open end to form a fluid communication from the interior of the filter to the collection vessel.

49. The purification device of claim 48, further comprising a sample reservoir device that includes a connector capable of connecting the sample reservoir device to the filter to form a fluid communication between the sample reservoir device and the filter.

50. The purification device of claim 48, wherein the collection vessel further comprises a tubular body extending from the opening, and a shoulder disposed on the tubular body.

51. The purification device of claim 48, wherein the adapter plate comprises a substrate including a first surface, a second surface, each of the one or more through-holes extends at

least from the first surface to the second surface, and the collection vessel is disposed in one of the one or more through-holes.

52. The purification device of claim 51, wherein the collection vessel further comprises a tubular body including a shoulder adjacent the first open end and wherein the shoulder contacts the first surface of the adapter plate.

53. A purification system comprising:
the purification device of claim 51;
a vacuum source; and
a vacuum manifold connected to the vacuum source;
wherein the second surface of the adapter plate is operatively disposed in the vacuum manifold such that in operation the system is capable of creating a pressure gradient across the RNA-capturing membrane.

54. A method, comprising the steps of:
providing the purification device of claim 51; and
spinning the purification device.